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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/594,444

09/26/2006

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EXAMINER

WANG-HURST, KATHY W

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/594,444	Applicant(s) MARUHASHI ET AL.	
	Examiner KATHY WANG-HURST	Art Unit 2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-46 and 48-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-46 and 48-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicants submitted a verified English Translation of the priority document in order to perfect priority. The office action dated 11/26/2008 has been withdrawn. However, upon further reconsideration, a new ground of rejection is made as follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 22-31, 34, 37, 39, 41-46, 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. (US 2004/0165558) in view of Rappaport (US 6920504).

Regarding claim 22 and 49, Ling discloses a radio communications device ([0019]) comprising: a transmitter (Fig. 1 and [0022]) comprising: a plurality of transmission antennas for radiating radio waves based on transmission RF signals (Fig. 1 items 124A-124T); a plurality of transmitting circuit means for supplying the transmission RF signals to said plurality of the transmission antennas, respectively, based on a plurality of transmission signals (Fig. 1 items 122a-122T, 120, 132 and 114 and [0022][0023]); and transmission signal processing means comprising modulating means, for modulating input transmission data to generate said plurality of the transmission signals by using said modulating means([0022][0023]), and for outputting the modulated plurality of the transmission signals to said plurality of the transmitting

circuit means([0022][0023]); a receiver (Fig. 1) comprising: a plurality of reception antennas for receiving the radio waves transmitted by the plurality of the transmission antennas and outputting reception RF signals based on the received radio waves (Fig. 1 items 152A-152R); a plurality of receiving circuit means for outputting reception signals based on said reception RF signals output respectively from by said plurality of the reception antennas (see e.g. Fig. 1 item 154A-154R, 156, 162 and 158 and [0034][0035]); and reception signal processing means comprising demodulating means([0034]), for demodulating the reception signals output respectively from said plurality of the receiving circuit means by using said demodulating means to generate reception data ([0034][0035]); propagation detecting means for detecting a propagating state of said radio waves received by said plurality of the reception antennas ([0022]-[0023]); and coding and modulation schemes setting means for selecting a coding and modulation scheme ([0031][0035][0040]), to be used during modulation and demodulation, from a plurality of coding and modulation schemes based on the detected propagating state ([0035][0041]), and for setting the selected coding and modulation schemes in said modulating means and said demodulating means.

Ling discloses setting and selecting coding and modulation schemes but does not explicitly disclose setting and selecting symbol rate based on the detected propagating state. In an analogous art, Rappaport teaches setting and selecting symbol rate based on the detected propagating state ([0045]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling, to adjust various

settings such as symbol rates to achieve identified performance goals for the communication network, as taught by Rappaport, thus facilitating the automated determination of desirable configuration setting for the wireless transceivers ([0045]).

Regarding claim 23, Ling discloses a radio communications device comprising: a transmitter (Fig. 1 and [0022]) comprising: a plurality of transmission antennas for radiating radio waves based on transmission RF signals (Fig. 1 items 124A-124T); a plurality of transmitting circuit means for supplying the transmission RF signals to said plurality of the transmission antennas, respectively, based on a plurality of transmission signals (Fig. 1 items 122a-122T, 120, 132 and 114 and [0022][0023]); and transmission signal processing means comprising a plurality of modulating means having respective different modulating schemes ([0040][0041]), for modulating input transmission data to generate said plurality of the transmission signals by using a selected one of said plurality of the modulating means ([0040][0041]), and for outputting the transmission signals to said transmitting circuit means ([0040][0041]); a receiver (Fig. 1) comprising: a plurality of reception antennas for receiving the radio waves transmitted by the plurality of the transmission antennas and outputting reception RF signals based on the received radio waves (Fig. 1 items 152A-152R); a plurality of receiving circuit means for outputting reception signals based on said reception RF signals output respectively from by said plurality of the reception antennas (see e.g. Fig. 1 item 154A-154R, 156, 162 and 158 and [0034][0035]); and reception signal processing means having a plurality of demodulating means comprising respective different demodulation schemes ([0021]), for demodulating the reception signals output respectively by said plurality of the

receiving circuit means by using a selected one of said plurality of the demodulating means to generate reception data ([0034][0070]); propagation detecting means for detecting a propagating state of said received radio waves ([0022][0023]); and modulating means/demodulating means selecting means for selecting one of said modulating means and one of said demodulating means for modulating the input transmission data and for demodulating the reception signals, respectively ([0030][0031][0035][0040]), based on the detected propagating state ([0023][0031]).

Regarding claims 24 and 25 and 48, Ling discloses the radio communications device according to claim 22 and 23 respectively, wherein said received propagation detecting means detects the propagating state of said radio waves according to at least one of the following: the level of a reception electric power level of said received radio waves, a transmission error rate, a retransmission rate, or a channel matrix estimated in a spatial multiplexing process ([0035]).

Regarding claim 26 and 28, combination of Ling and Rappaport discloses setting various data processing parameters such as symbol rate and modulation schemes based on the propagating state detected by said propagation detecting means.

Regarding claim 27 and 29 and 34, Ling discloses adjusting data processing parameters such as code and modulation schemes due to multipath effects ([0035]).

Regarding claim 30 and 31, combination of Ling and Rappaport discloses adjusting modulation schemes in order to increase or decrease symbol rates.

Regarding claim 37, Ling discloses the radio communications device according to claim 34, wherein said control means instructs said modulating means and said

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demodulating means to select any one of modulating and demodulating processes including ASK, BPSK, FSK, QPSK, and DQPSK ([0040][0041]) and to use one of said plurality of transmitting circuit means and one of said plurality of receiving circuit means, respectively, when it is determined that the interference is weak (noise is low from SNR), and instructs said modulating means and said demodulating means to select either of modulating and demodulating processes including multivalued PSK and multivalued QAM and to use said plurality of transmitting circuit means and said plurality of receiving circuit means, respectively, when it is determined that the interference is strong (noise is high from SNR) ([0021][0022]).

Regarding claim 39, combination of Ling and Rappaport discloses the radio communications device according to claim 22, wherein said transmission antennas and said reception antennas are shared.

Regarding claim 45 and 46, Ling discloses the radio communications device of claim 22, wherein the propagation detecting means receives as input a channel matrix based on the reception signals, a reception level of the reception signals, and a bit error rate of the reception signals, and detects the propagating state of the received radio waves based on the received input ([0011][0030][0040]).

Claim 41 is rejected on the same grounds as claim 22.

Claim 42 is rejected on the same grounds as claim 22.

Claim 43 is rejected on the same grounds as claim 23.

Claim 44 is rejected on the same grounds as claim 23.

Claim 50 is rejected on the same grounds as claim 22.

4. Claims 32, 33 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling, in view of Rappaport, further in view of Kadous et al. (US 2005/0075073).

Regarding claims 32, 33 and 38, combination of Ling and Rappaport discloses varying data transmission rate based on channel condition but fails to disclose varying the number of transmitting circuit means used according to the channel condition.

Kadous teaches varying the number of transmitting circuit means used according to the channel condition ([0009]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling in view of Rappaport, to turn off transmit antennas depending on the data rate, as taught by Kadous, thus reducing interference by turning off the undesirable transmit means ([0009]).

5. Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling in view of Rappaport, further in view of Ashby (US 5861781).

Regarding claims 35 and 36, Ling in view of Rappaport discloses varying modulation and demodulation schemes to achieve optimal performance, but fails to disclose employing direct or indirect modulation to achieve optimal performance.

Ashby teaches employing direct or indirect modulation to achieve optimal performance (col. 1 lines 24-45, choosing indirect modulation over direction modulation; and col. 2 lines 44-55; col. 4 lines 29-43).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling in view of Rappaport,

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to apply different modulation mechanisms to process the signals, as taught by Ashby, thus improving the accuracy of the phase shift (col. 1, lines 24-45).

6. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ling in view of Rappaport, further in view of Santhoff et al. (US 2005/0058114).

Regarding claim 40, Ling in view of Rappaport discloses the radio waves radiated by a plurality of transmission antennas but fails to explicitly disclose the radio waves radiated by a plurality of transmission antennas having a frequency of 10GHz.

Santhoff teaches the radio waves radiated by a plurality of transmission antennas having a frequency of 10GHz ([0081][0082]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling in view of Rappaport, to transmit at a higher radio frequency range that extends up to 10 GHz, as taught by Santhoff, thus utilizing significantly larger contiguous portions of the radio frequency spectrum ([0082]).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Haustein et al. (US 2004/0171385) discloses an adaptive signal processing method in a MIMO-system.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATHY WANG-HURST whose telephone number is

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(571) 270-5371. The examiner can normally be reached on Monday-Thursday, 7:30am-5pm, alternate Fridays, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nick Corsaro can be reached on (571) 272-7876. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KATHY WANG-HURST/
Examiner, Art Unit 2617

/NICK CORSARO/
Supervisory Patent Examiner, Art Unit 2617